

Johnsenite-(Ce) $\text{Na}_{12}(\text{Ce}, \text{La}, \text{Sr}, \text{Ca}, \square)_3\text{Ca}_6\text{Mn}_3\text{Zr}_3\text{W}(\text{Si}_{25}\text{O}_{73})(\text{CO}_3)(\text{OH}, \text{Cl})_2$

Crystal Data: Hexagonal. *Point Group:* 3m. As deeply etched, skeletal crystals, to 4 mm and in aggregates to 1 cm; crystals display partial {0001} and $\{10\bar{1}1\}$.

Physical Properties: *Cleavage:* None. *Fracture:* Uneven. *Tenacity:* Brittle. *Hardness* = 5-6
D(meas.) = 3.24(3) D(calc.) = 3.23

Optical Properties: Transparent to translucent. *Color:* Pale yellow to bright orange.

Streak: White. *Luster:* Vitreous.

Optical Class: Uniaxial (-). $\omega = 1.648(1)$ $\varepsilon = 1.637(1)$

Cell Data: *Space Group:* R3m. $a = 14.2675(7)$ $c = 30.0369(14)$ $Z = 3$

X-ray Powder Pattern: Poudrette Quarry, Mont Saint-Hilaire, Quebec, Canada.
2.966 (100), 11.299 (95), 9.452 (81), 2.847 (81), 3.164 (75), 3.544 (44), 3.392 (38)

Chemistry:		(1)		(1)
	Na ₂ O	10.47	Gd ₂ O ₃	0.33
	K ₂ O	0.25	Dy ₂ O ₃	0.14
	CaO	8.98	TiO ₂	0.73
	SrO	1.60	ZrO ₂	9.60
	MnO	5.43	HfO ₂	0.04
	FeO	1.61	Nb ₂ O ₅	0.82
	Y ₂ O ₃	0.70	WO ₃	5.23
	La ₂ O ₃	1.56	SiO ₂	43.16
	Ce ₂ O ₃	3.01	Cl	0.77
	Pr ₂ O ₃	1.14	CO ₂	[1.27]
	Nd ₂ O ₃	0.89	H ₂ O	[0.32]
	Sm ₂ O ₃	0.12	-O = Cl	0.17
		Total	98.00	

(1) Poudrette Quarry, Mont Saint-Hilaire, Canada; average of 8 electron microprobe analyses supplemented by IR spectroscopy, H₂O and CO₂ calculated from structure analysis; corresponds to Na_{11.74}[(Ce_{0.64}La_{0.33}Dy_{0.03}]_{Σ=1.00}Sr_{0.54}Ca_{0.51}Y_{0.22}K_{0.19}Hf_{0.01}]_{Σ=2.47}(Ca_{5.06}[Pr_{0.24}Nd_{0.18}Gd_{0.06}Sm_{0.02}]_{Σ=0.50}Mn_{0.44}]_{Σ=6.00}(Mn_{2.22}Fe_{0.78}]_{Σ=3.00}(Zr_{2.71}Ti_{0.32}]_{Σ=3.03}(W_{0.78}Nb_{0.21}]_{Σ=0.99}Si_{24.97}O₇₃(CO₃)(OH_{1.25}Cl_{0.75}]_{Σ=2.00}.

Mineral Group: Eudialyte group.

Occurrence: In a cavity near the margin of a marble xenolith in an igneous breccia along the contact between porphyritic nepheline syenite and sodalite syenite in an alkaline igneous complex.

Association: Albite, calcite, pectolite, aegirine, fluorapophyllite, zirsilite-(Ce), a burbankite group mineral, dawsonite, rhodochrosite, epididymite, galena, molybdenite, pyrite, pyrrhotite, quartz, an amphibole-group mineral, sphalerite, stillwellite-(Ce), titanite, cerite-(Ce), tapersuatsiaite, steacyite, catapleiite, zakharovite, natrolite, microcline.

Distribution: From level 7 bench, SE wall, Poudrette Quarry, Mont Saint-Hilaire, Quebec, Canada.

Name: Honors Ole Johnsen (b. 1940), Geological Museum, University of Copenhagen, Denmark, for his research on the eudialyte group and the minerals of Greenland, and for the dominant rare earth element, Cesium.

Type Material: Canadian Museum of Nature, Ottawa, Ontario, Canada (CMNMC 84395).

References: (1) Grice, J.D. and R.A. Gault (2006) Johnsenite-(Ce): a new member of the eudialyte group from Mont Saint-Hilaire, Quebec, Canada. *Can. Mineral.*, 44, 105-115. (2) (2006) Amer. Mineral., 91, 1947 (abs. ref. 1).